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EXAMINER	
MENBERU, BENIYAM	
ART UNIT	**PAPER NUMBER**
2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/010,209	BORG, LARS U.	
	Examiner	Art Unit	
	Beniyam Menberu	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/23/2002*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 24, 26, 27, 28, 29, 30, 31, and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6373580 to Walker.

Regarding claim 1, Walker discloses a computer-implemented method (column 4, lines 60-65) for using a color table, the color table defining a mapping from a source color space representing colors in source color coordinates to a destination color space representing colors in destination color coordinates, the color table defining for each of a domain of source colors in the source color space a corresponding destination color in the destination color space, the method comprising (column 2, lines 51-64):

receiving an input color represented in the source color space (column 2, lines 37-41; column 3, lines 24-27);

determining a location of the input color in a cell of the color table in terms of cell coordinate values in a cell coordinate system (column 3, lines 39-55), each corner of the

cell representing a source color and a corresponding destination color (Figure 3; column 4, lines 9-20), each coordinate value corresponding to a dimension of the source color space (column 4, lines 9-20);

determining an order of the cell coordinate values (column 3, lines 56-63);

determining a processing order of the dimensions of the source color space according to the order of the cell coordinate values (column 4, lines 11-19); and

using the cell coordinate values in the processing order to calculate an output color represented in the destination color space, making no more interpolation calculations than the number of source color space dimensions multiplied by the number of destination color space dimensions (column 4, lines 19-40; Walker discloses calculation by interpolation wherein equations 2,3,4,5 are performed to get final output which corresponds to 4 calculation. In this example the number of input dimension is N=4 and output is M=1, therefore NxM=4 which corresponds to the 4 calculation (column 4, lines 9-12)).

Regarding claim 2, Walker teaches all the limitations of claim 1. Walker further discloses the method, wherein determining an order comprises determining an order of the cell coordinate values from large to small (column 3, lines 58-61;column 4, lines 11-13; In this example Walker selects z=4.9 as highest since the fractional part 0.9 is higher than any of the other fractional parts for x,y, and w).

Regarding claims 4 and 20, Walker teaches all the limitations of claims 1 and 17 respectively. Walker further discloses the method and program (column 4, lines 49-64),

wherein using the cell coordinate values in the processing order to calculate an output color comprises:

interpolating a contribution to the output color from each cell coordinate value associated with the input color until a termination condition is reached, while excluding previously processed cell coordinates (column 3, lines 64-67; column 4, lines 1-7, lines 16-39); and

adding the interpolated contributions to generate an output color corresponding to the input color (column 4, lines 21-39).

Regarding claims 5 and 21, Walker teaches all the limitations of claims 4 and 20 respectively. Walker further discloses the method and program, wherein the termination condition is that all cell coordinate values associated with the input color have been processed (column 4, lines 2-7, lines 15-20).

Regarding claims 6, 16, 22, and 32, Walker teaches all the limitations of claims 4, 14, 20, and 30 respectively. Walker further discloses the method, wherein the termination condition is that a cell coordinate value of zero has been reached (Walker ranks the fractional component of the input point from largest to smallest. The fractional portion determines the cell coordinate value. If the smallest value ends up being 0.0 implying that one of the input component is located on a grid point then this component will be the last calculation in the interpolation and thus terminating the calculation as shown in the example in column 4, lines 20-39 wherein the dy=0.0 is the last term to be calculated.).

Regarding claims 8 and 24, Walker teaches all the limitations of claims 1 and 17 respectively. Further Walker discloses the method wherein using the cell coordinate values in the processing

order to calculate an output color comprises:

interpolating a contribution to one destination color coordinate associated with the output color from each source color coordinate associated with the input color (column 4, lines 16-25; Walker discloses interpolating along the cube which represents the cell where the input color lies in. The difference of the coordinate values contribute to the final interpolation output.); and repeating the interpolating step for all remaining destination color coordinates associated with the output color (column 4, lines 25-40; Walker repeats the calculation for the remaining coordinates starting with z component then x, w, and finally y.).

Regarding claims 10 and 26, Walker teaches all the limitations of claims 1 and 17 respectively. Further Walker discloses the method wherein using the cell coordinate values in the processing order to calculate an output color further comprises:

if the input color corresponds to a source color represented in a cell corner, assigning the destination color coordinates associated with the output color to be equal to the destination color coordinates for the destination color corresponding to the source color (In equation 5 on column 4, line 37, when one of the component (dx, dy, dw, dz) is 1 and the rest are zero which correspond to cell corner , the equation will reduce to one component. For example if dz=1, dy=0, dw=0, dz=0, which means that the input lies on point B in Figure 4, equation 5 will become ACC=A+(B-A)=B).

Regarding claims 11 and 27, Walker teaches all the limitations of claims 1 and 17 respectively. Further Walker discloses the method, wherein each cell has a cell coordinate system with a same range of coordinate values (Walker discloses interpolation within a cube which contains the input color (5.7, 6.3, 3.4) wherein the dimension of the cubes are 1X1X1(since vertex of cube is (5,6,3), (5,6,4), (5,7,3)....), thus the range of each cube is 1 in each dimension. (column 3, lines 39-56)).

Regarding claims 12 and 28, Walker teaches all the limitations of claims 1 and 17 respectively. Further Walker discloses the method of claim 1, wherein the source color space and the destination color space are selected from the group of color spaces consisting of RGB, CMY, L*a*b*, YCC, L*u*v*, Yxy, HSV, CMYK, MCYK, RGBW, hexachrome, and spectral data color spaces (column 2, lines 39-44, lines 58-64).

Regarding claims 13 and 29, Walker teaches all the limitations of claims 1 and 17 respectively. Further Walker discloses the method of claim 1, wherein the cell coordinate system is aligned with at least one edge of a cell of the color table (Walker interpolates using the fractional part to determine the order of interpolation. The cell coordinate system corresponds to the cube as shown in Figure 2. The cube is aligned with the xyz axis as shown in Figure 2.).

Regarding claims 14 and 30, Walker discloses (Walker discloses a computer program in the Appendix to implement the invention (column 5, 6)) a computer-implemented method and a computer program product, tangibly stored on a computer-readable medium (column 4, lines 60-65), for using a color table to determine an output color in a destination color space based on an input color in a source color space, the

color table defining a mapping from the source color space representing colors in source color coordinates to a destination color space representing colors in destination color coordinates, the color table defining for each of a domain of source colors in the source color space a corresponding destination color in the destination color space (column 2, lines 51-64), the method comprising:

receiving an input color represented in the source color space (column 2, lines 37-41; column 3, lines 24-27);

determining a cell of the color table that encloses the input color, each corner of the cell representing a source color and a corresponding destination color and one corner of the cell being the cell origin (column 3, lines 39-55; Figure 3; column 4, lines 9-20; column 4, lines 9-20);

determining a location of the input color within the cell in terms of cell coordinate values in a cell coordinate system having an origin coinciding with the cell origin, each coordinate value corresponding to a dimension of the source color space (Walker discloses using fractional part of input to determine ranking. Further the unit cube that surrounds the input is determined. The fractional part determines the location of input within this cube. The cell coordinate system is defined by this unit cube. The base vertex defines the origin (column 3, lines 23-56));

setting the destination color of the cell origin to be an initial output color (column 4, lines 12-20);

selecting the highest cell coordinate value for the input color (Walker ranks the input fractional values which represent the cell coordinate values from highest to smallest and starts the interpolation from the highest value (column 4, lines 11-15).);

obtaining the destination color at the corner of the cell that is opposite to the cell origin for the source color space dimension corresponding to the selected cell coordinate value (In Figure 4, interpolation order is A→B→C→D→E. Walker starts interpolation at A and the corner opposite to A is C. In the interpolation calculation for the second cycle the value of C is used to determine the contribution in the x direction (column 4, lines 14-30));

interpolating a contribution to the output color using the selected cell coordinate value and the destination colors at the origin and at the opposite corner (column 4, lines 25-31; "A" represents value at origin and "C" represents the opposite corner.);

adding the interpolated contribution to the output color (column 4, lines 25-35);

determining a final output color by repeating the steps of selecting, obtaining, interpolating and adding, while using the corner opposite to the cell origin as a new cell origin and excluding processed cell coordinate values, until a termination condition is reached (Walker performs repeated addition, selection of values to be used for interpolation. Every cycle a new corner is used as starting point for interpolation (column 4, lines 20-39, lines 2-7)).

Regarding claims 15 and 31, Walker teaches all the limitations of claims 14 and 30 respectively. Further Walker discloses the method wherein the termination condition

is that all cell coordinate values for the input color have been processed (column 4, lines 2-7).

Regarding claim 17, Walker discloses a computer program product, tangibly stored on a computer-readable medium (Walker discloses a computer program in the Appendix to implement the invention (column 5, 6); (column 4, lines 60-65)), for using a color table, the color table defining a mapping from a source color space representing colors in source color coordinates to a destination color space representing colors in destination color coordinates, the color table defining for each of a domain of source colors in the source color space a corresponding destination color in the destination color space (column 2, lines 51-64), comprising instructions operable to cause a programmable processor to:

receive an input color represented in the source color space (column 2, lines 37-41; column 3, lines 24-27);

determine a location of the input color in a cell of the color table in terms of cell coordinate values in a cell coordinate system(column 3, lines 39-55), each corner of the cell representing a source color and a corresponding destination color(Figure 3; column 4, lines 9-20), each coordinate value corresponding to a dimension of the source color space (column 4, lines 9-20);

determine an order of the cell coordinate values(column 3, lines 56-63);

determine a processing order of the dimensions of the source color space according to the order of the cell coordinate values(column 4, lines 11-19); and

use the cell coordinate values in the processing order to calculate an output color represented in the destination color space, making no more interpolation calculations than the number of source color space dimensions multiplied by the number of destination color space dimensions(column 4, lines 19-40; Walker discloses calculation by interpolation wherein equations 2,3,4,5 are performed to get final output which corresponds to 4 calculation. In this example the number of input dimension is N=4 and output is M=1, therefore NxM=4 which corresponds to the 4 calculation (column 4, lines 9-12)).

Regarding claim 18, Walker teaches all the limitations of claim 17. Further Walker discloses the computer program product of claim 17, wherein the instructions to determine an order comprise instructions to determine an order of the cell coordinate values from large to small (column 3, lines 58-61;column 4, lines 11-13; In this example Walker selects z=4.9 as highest since the fractional part 0.9 is higher than any of the other fractional parts for x,y, and w).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3, 7, 19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6373580 to Walker in view of U.S. Patent No. 6389161 to Krabbenhöft.

Regarding claim 3, Walker teaches all the limitations of claim 1. However Walker does not disclose the method of claim 1, wherein determining an order comprises determining an order of the cell coordinate values from small to large.

Krabbenhöft discloses a method wherein determining an order comprises determining an order of the cell coordinate values from small to large (column 6, lines 25-40; column 9, lines 56-61).

Walker and Krabbenhöft are combinable because they are in the similar problem area of color interpolation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the sorting method of Krabbenhöft with the system of Walker to implement color interpolation starting with the smallest component.

The motivation to combine the reference is clear because the method of Krabbenhöft provides for a reverse operation for interpolating color values (column 9, lines 63-65).

Regarding claims 7 and 23, Walker teaches all the limitations of claims 1 and 17 respectively. Further Krabbenhöft discloses interpolating, in parallel, contributions to all destination color coordinates associated with the output color from each source color coordinate associated with the input color (column 5, lines 18-49).

Regarding claim 19, Walker teaches all the limitations of claim 17. Further Krabbenhöft discloses the computer program product of claim 17, wherein the instructions to determine an order comprises instructions to determine an order of the cell coordinate values from small to large (column 6, lines 25-40; column 9, lines 56-61).

5. Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6373580 to Walker in view of U.S. Patent No. 5678033 to Moledina et al.

Regarding claims 9 and 25, Walker teaches all the limitations of claims 1 and 17 respectively. However Walker does not disclose the method of claim 1, further comprising:

processing, simultaneously, all source color coordinates that are associated with the input color and that have identical values by interpolating a contribution to the destination color coordinates associated with the output color.

Moledina et al disclose processing, simultaneously, all source color coordinates that are associated with the input color and that have identical values by interpolating a contribution to the destination color coordinates associated with the output color (column 5, lines 60-67; column 6, lines 1-13).

Walker and Moledina are combinable because they are in the similar problem area of color interpolation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the simultaneous processing of Moledina et al with the system of Walker to implement simultaneous processing of color interpolation.

The motivation to combine the reference is clear because simultaneous operation can reduce interpolation time.

Other Prior Art Cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6292195 to Shimizu et al disclose color signal selector.

U.S. Patent No. 5774386 to Pawle disclose an interpolation system.

U.S. Patent No. 6415065 to Miyake disclose image processor with interpolation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (571) 272-7465. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (571) 272-7471. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (571) 272-2600. The group receptionist number for TC 2600 is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patent Examiner

Beniyam Menberu

BM

07/10/2005

KAWilliams

KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER